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(54) A reinforcing element for connection to panels

(57) Panels 6, 7 are reinforced by connecting to them a combined connecting and reinforcing element. The element has a reinforcing part which is a strip shaped so as to be rigid in the plane of the panel, and a connecting part which has deformable lips 4, 5 which engage bent, deformable parts 8, 9 of the panel. Once the lips and bent parts of the panel are engaged, deformation is produced in these parts so that a permanent connection is produced. The element can be attached in the middle of a plate, or at a joint between two plates when it performs the function of reinforcing the plates and also the function of joining them.

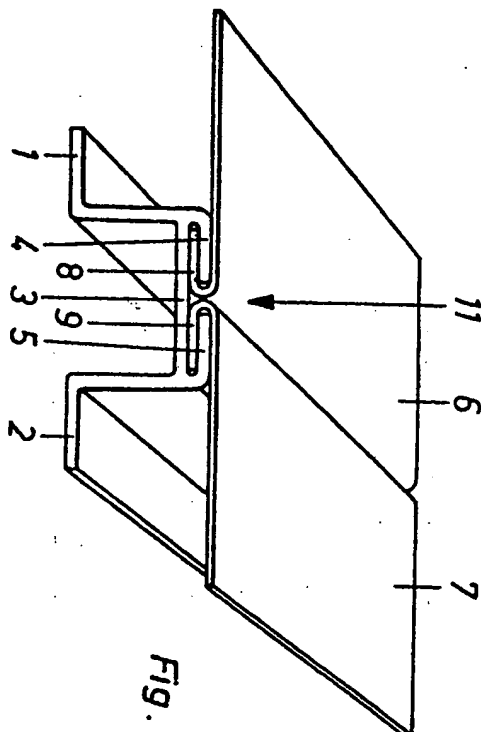


Fig. 4

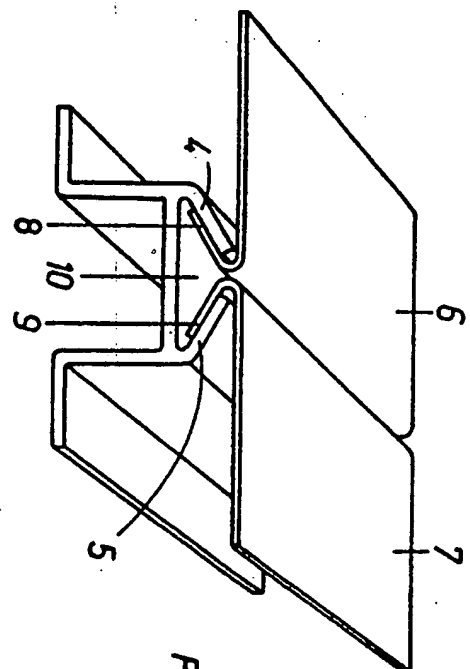


Fig. 3

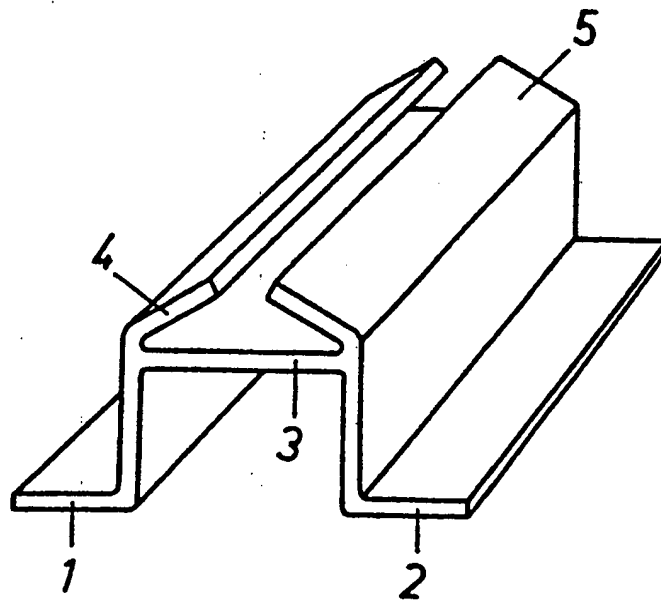


Fig. 1

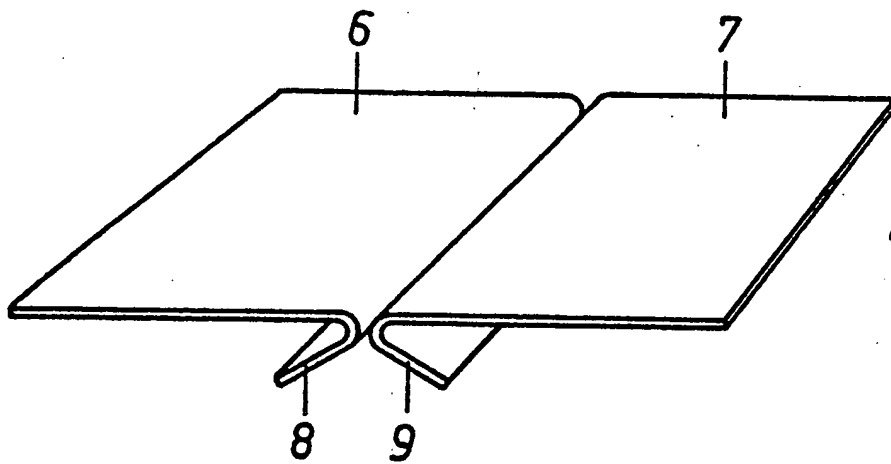


Fig. 2

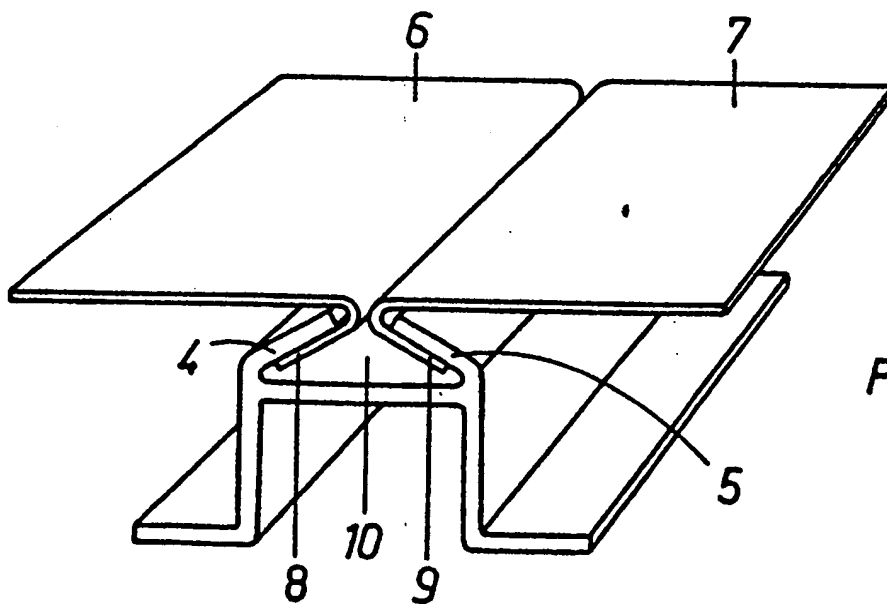
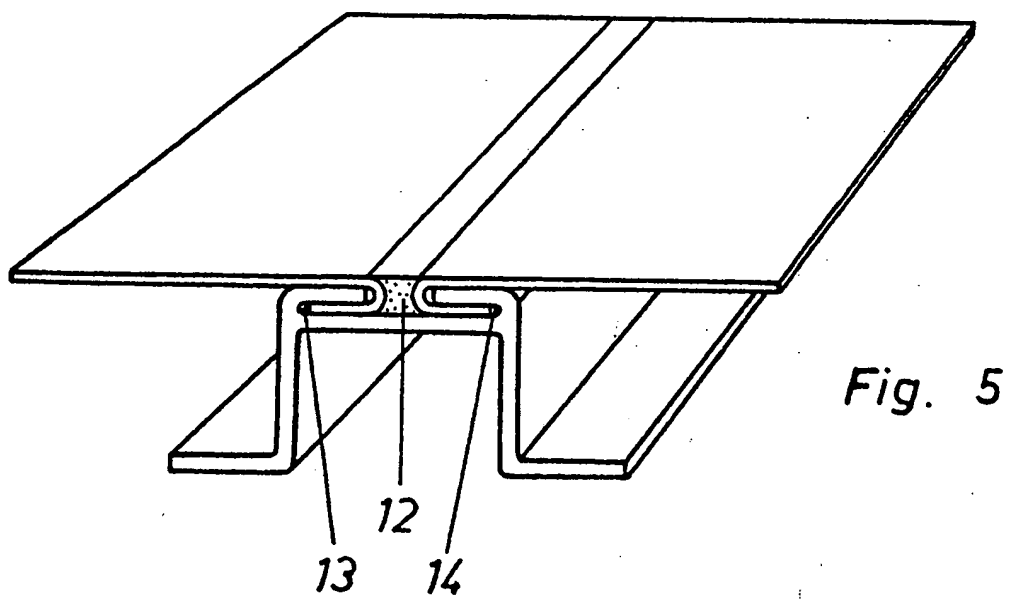
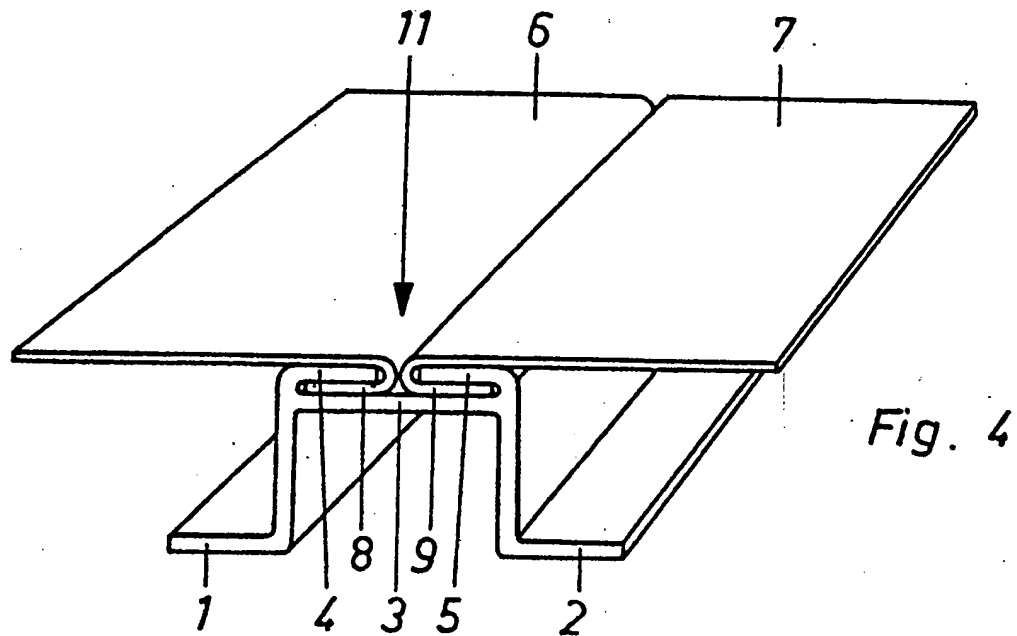
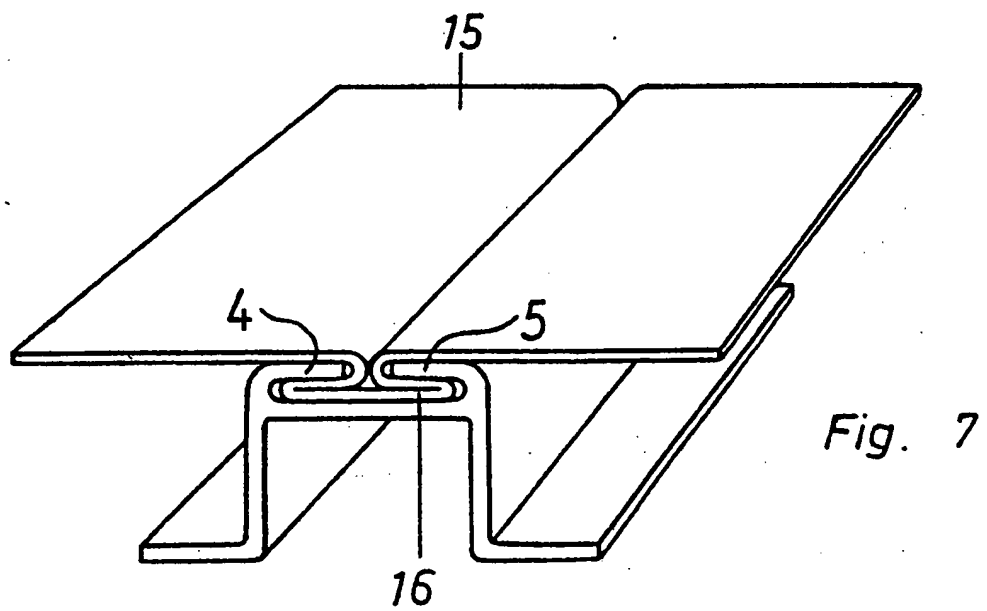
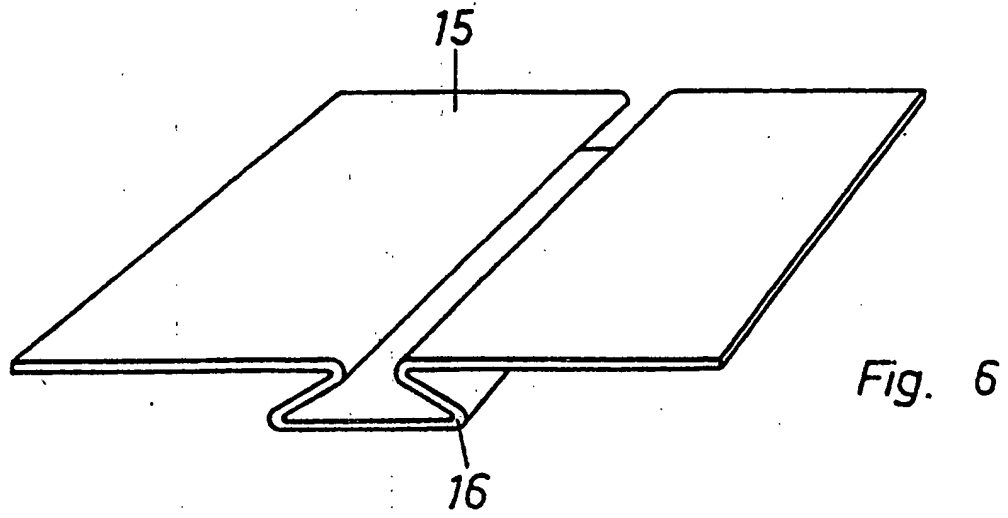


Fig. 3

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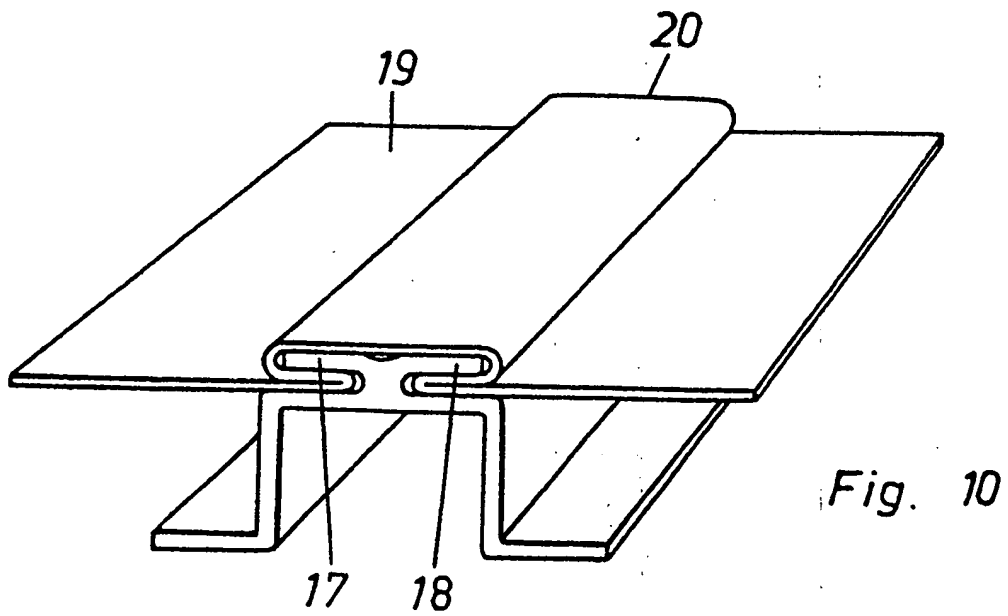
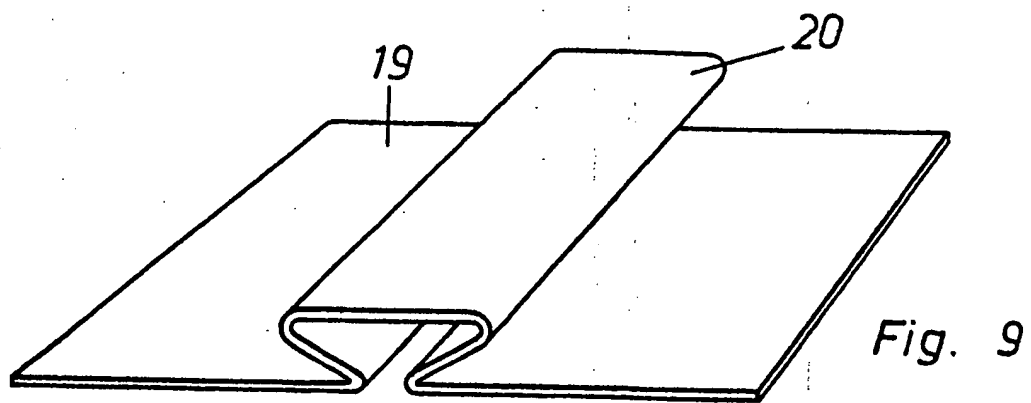
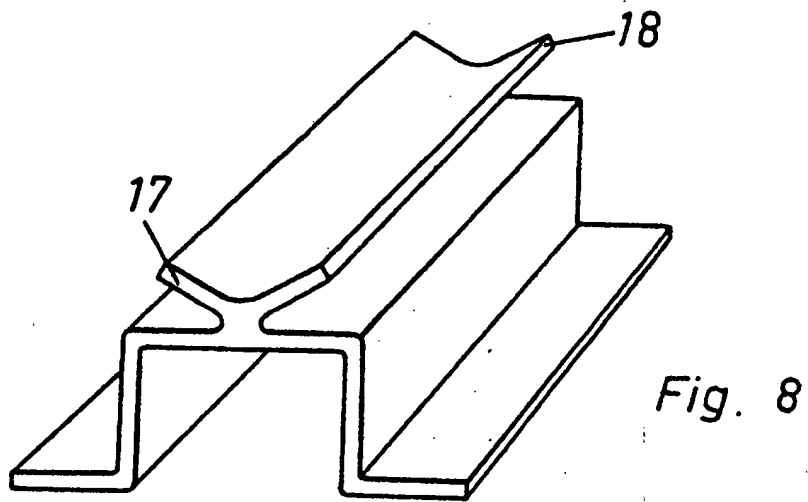
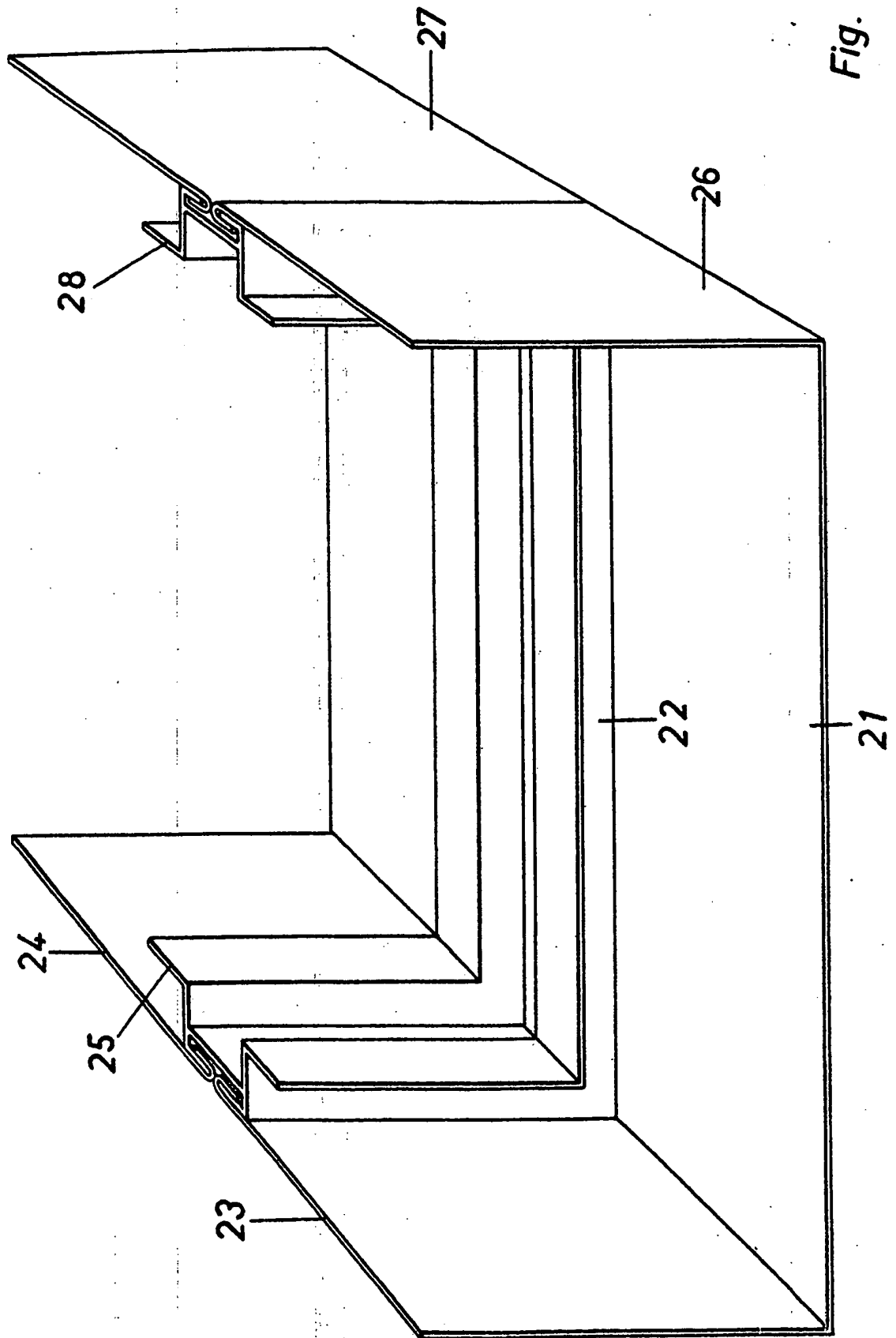


Fig. 11



SPECIFICATION

A reinforcing element for connection to plate-like members

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This invention relates to a reinforcing element for connection to a deformable plate-like member or members. The element can be used for joining two such members, and for reinforcing the joint or for reinforcing a central portion of a plate-like member.

There are a number of known elements intended for connecting two plate-like members. However, these generally lack any integral means for reinforcing the joint. It has therefore been conventional practice to connect the two members and then to subsequently attach a reinforcing section by a further step.

According to the present invention, there is provided a reinforcing element for connection to a deformable plate-like member or members, the element comprising a shaped reinforcing part and a gripping part having deformable gripping lips which can be deformed to grip the plate-like member or members.

The gripping part is arranged so that the plate-like member or members lie in one plane once they have been gripped, and the reinforcing element prevents bowing of the member or members in that one plane. The element is elongate and extends right across the member or members.

The invention is particularly suitable for use in containers or box sections, e.g. for motor vehicles.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figures 1 to 4 show successive stages in the reinforcement of a joint between two plates, using an element according to the invention;

Figure 5 shows an alternative way of finishing the connection shown in *Figs. 1 to 4*;

Figures 6 and 7 show the use of the reinforcing element of *Figs. 1 to 5* for reinforcing a single plate;

Figures 8 to 10 show successive stages in the reinforcement of a single plate using a second embodiment of reinforcing element according to the invention; and

Figure 11 shows a box structure reinforced by reinforcing elements according to the first embodiment of the invention.

In the following description, and in the drawings, a top-hat reinforcement section is shown. This reinforcement section has angled wings 1, 2 joined by a web 3. This section is shown by way of example only, and could be replaced by a wide variety of known reinforcement sections such as angled structures, U-sections or box girders.

The reinforcing element shown in *Fig. 1* has, as previously mentioned, a reinforcing

part 1, 2, 3 and gripping lips 4, 5 attached at edges of the web 3. The lips 4 and 5 are angled upwards away from the web 3.

Fig. 2 shows two plates 6, 7 which are to be connected to one another with the joint between them being reinforced. It will be seen that both plates lie in one plane, and have turned-over edges 8, 9.

Fig. 3 shows the plates of *Fig. 2* with their edges 8, 9 inserted under the lips 4, 5 of the reinforcing element. The next stage in the connection of the two elements is the application of pressure in a direction indicated by arrow 11 (*Fig. 4*) to close the empty space 10 and to deform the lips 4, 5 and the edges 8, 9 so that these parts and the plates 6, 7 all lie parallel to the web 3. It will be seen that the edges 8, 9 are now gripped between the respective lips 4, 5 and the web 3. The material of the reinforcing element is chosen so that the deformation of the lips 4 and 5 is permanent, so that a permanent connection is provided between the plates 6 and 7 and the reinforcing element.

Fig. 5 shows the insertion of a resilient sealing material to provide an additional sealing effect between the plates. Sealing material 12 is inserted into the space 10 before pressure is applied to the joint, and when the pressure is applied the sealing material spreads out to fill any available space. Additional sealing material may reach areas 13 and 14, or may be specifically placed in these positions.

Figs. 6 and 7 show how the reinforcing element can be connected to a central portion of a plate 15. A dovetail shape 16 is formed in the central portion of the plate, and this dovetail portion is inserted into the space between the gripping lips 4 and 5. As before, a downward pressure is applied to deform the lips 4 and 5, with the result which can be seen in *Fig. 7*.

A sealing material as shown in *Fig. 5* can also be used in this embodiment.

Figs. 8 to 10 show a modification of the reinforcing element. In the modification, the element has gripping lips 17 and 18 which extend outwardly, rather than inwardly in the previous embodiments. This element can be attached to a central portion of a plate 19 by forming a dovetail portion 20 which is received over the gripping lips 17 and 18. The lips are then deformed to grip a doubled over part of the plate 19 between themselves and the reinforcing part.

Fig. 11 shows reinforcing elements 22, 25 and 28 applied to three sides of a box section. The element 25 connects plates 24 and 23; the element 28 connects parts 26 and 27; and the element 22 is positioned in the base plate 21. All these connections are as previously described. The joints between the reinforcing elements 22, 25 and 22, 28 can be welded together or secured in any other

suitable manner. Likewise, the edges of the plates 21 and 23, 21 and 26 etc. can also be welded together.

5 CLAIMS

1. A reinforcing element for connection to a deformable plate-like member or members, the element comprising a shaped reinforcing part and a gripping part having deformable gripping lips which can be deformed to grip the plate-like member or members.
2. A reinforcing element as claimed in claim 1 connected to a plate-like member or members, with a resilient sealing substance received in the joint between the gripping lips and the plate-like member or members.
3. A reinforcing element substantially as herein described with reference to Figs. 1, 3 to 5, 7 and 11 or Figs. 8 and 10 of the accompanying drawings.

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